NATURAL RESOURCE CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

FORAGE HARVEST MANAGEMENT
(Acre)
CODE 511

DEFINITION

The timely cutting and removal of forages as hay, silage (haylage, baleage), or greenchop.

PURPOSE

The purpose of forage harvest management may be to:

- Optimize the economic yield of forage at the desired quality and quantity
- Promote vigorous plant regrowth
- Maintain desired species composition of the stand
- Control insects, diseases and weeds
- Maintain and/or improve wildlife habitat.

CONDITION(S) WHERE PRACTICE APPLIES

This practice applies to all land uses where machine harvested forage crops are grown.

CRITERIA

Criteria for this practice are based upon:

- stage of maturity
- stubble height
- moisture content
- length of cut, or chop
- contaminants
- pest management.

Stage of Maturity Criteria

Harvest forages at the stage of maturity which provides the desired quality and quantity. *Recommended stages of maturity at harvest are listed in Appendices A.1. - A.2. These stages represent a compromise between yield and quality.*

Stubble Height Criteria

Cut forage plants at a height that will promote the vigor and health of the desired species. *Recommended stubble heights are listed in Appendices A.1.-A.2.*

Moisture Content Criteria (Hay)

For optimal forage quality, rake, ted, or invert swaths, and bale when hay has approximate percent (%) moisture as follows:

- Ted or invert swaths when moisture is above 40 to 50%
- Rake hay at 30 to 40% moisture
- Bale forced air dry hay at 20 to 35% moisture
- Bale field cured hay at 15 to 20% moisture.

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Moisture Content Criteria (Silage)

Harvest silage at the ideal moisture range for the type of storage structure(s) being utilized. Silages are typically classified by moisture content of the ensiled crop and are described as:

- high-moisture silage
- wilted silage
- haylage and baleage.

High-moisture Silage (70% moisture or greater) will need additives to improve quality. Use chemical preservatives or add dry feedstuffs to avoid fermentation and seepage digestible dry matter losses.

Wilted Silage (60 to 70% moisture). If a standing crop forage contains more than 75% moisture, it is necessary to allow the forage to dry in the swath or windrow until moisture drops to 60 to 70%.

Haylage and Baleage (40 to 60% moisture). Preservation depends on maintaining air-free conditions.

Length of Cut or Chop Criteria (Silage, for conventional silos)

Forage harvested as silage will be chopped to a size (typically, ¼ to ¾ inches long with crisp, sharp edges) that allows adequate packing to produce the anaerobic conditions necessary to ensure the proper ensiling process.

Contaminants Criteria

Contaminants are any objectionable matter or toxin that can cause illness, death, or rejection of the offered forage by the animal *(e.g., poisonous plants, toxins such as nitrate, or hardware).* Harvested forages shall not contain contaminants at levels which are harmful to the animal being fed.

Pest Management Criteria

Schedule harvest periods as needed to control pests. *For information about Pest Management, consult the Field Office Technical Guide, Section IV, Code 595.*

Additonal criteria to improve wildlife habitat

Where wildlife habitat improvement is the objective, forages shall be harvested from September 16 through April 14 to prevent disturbance of ground nesting wildlife.

CONSIDERATIONS

Well-fertilized plants withstand more frequent harvest schedules and may produce a higher quantity and quality of forage. *See the Field Office Technical Guide, Section IV, Nutrient Management (Code 590).*

To control forage pests *(i.e., plant diseases, insects and weeds),* clean harvesting equipment after harvest. When insect, disease, or weed outbreaks exceed economic thresholds and are uncontrollable by harvest management, consider other pest management methods. *See the Field Office Technical Guide, Section IV, Pest Management (Code 595).*

Consider using prescribed fire to remove thatch and recycle nutrients. *See the Field Office Technical Guide, Section IV, Prescribed Burning (Code 338).*

Consider the collection, storage, and disposal of silage leachate from the silo as part of an agricultural waste management system.

To reduce safety hazards, avoid operating harvesting equipment on field slopes greater than 25 percent.

Consider submitting samples to a testing laboratory for nutritional analysis before feeding to animals.

PLANS AND SPECIFICATIONS

All plans and specifications shall be consistent with this standard. As a minimum, plans and/or specifications shall include:

- all pastures or fields identified where Forage Harvest Management will be applied
- forage species name
- recommended stage of harvest
- recommended stubble height.

OPERATION AND MAINTENANCE

Before harvesting forage, clear fields of debris that could damage machinery. Inspect and repair harvesting equipment according to manufacturer's preventative maintenance procedures. Operate all harvesting equipment at the optimum settings and speeds to minimize loss of forage leaves.

Monitor weather conditions and delay harvest if prolonged or heavy precipitation is forecast that would seriously damage cut forage.

Regardless of silage storage method, ensure good compaction and an air-tight seal to exclude oxygen and mold formation.

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FORAGE HARVEST MANAGEMENT

APPENDICES

A1. Harvest Stage and Stubble Heights for GRASSES

Species	Stage to Harvest		Recommended Stubble Height[a] (inches)
	1st Harvest	2nd + Harvest	
PERENNIAL, COOL SEASON			
Orchardgrass (hay,silage)	boot to early bloom	every 21-35 days or at 12-15 inches tall	3 - 4
Ryegrass, Perennial (hay, silage)	boot to early bloom	every 21-35 days or at 12-15 inches tall	3 - 4
Tall Fescue (hay, silage)	boot to early bloom	every 21-35 days or at 12-15 inches tall	3 - 4
Timothy (hay, silage)	boot to early bloom	every 21-35 days or at 12-15 inches tall	4 - 6
PERENNIAL, WARM SEASON			
Bahiagrass (hay)	boot to bloom or at 12-15 inches tall	every 21-35 days or at 12-15 inches tall	2 - 3
Bermudagrass,Common (hay, silage)	boot to bloom or at 12-15 inches tall	every 21-35 days or at 12-15 inches tall	2 - 3
Bermudagrass, Hybrid (hay, silage)	boot to bloom or at 12-15 inches tall	every 21-35 days or at 12-15 inches tall	2 - 3
Bluestem, Big[b,c,d] (hay)	early boot or at 24-36 inches tall	every 21-35 days or at 18-36 inches tall	6 - 8[e]
Eastern Gamagrass[b,c,d] (hay)	early boot or at 24-36 inches tall	every 21-35 days or at 18-36 inches tall	6 - 8[e]
Indiangrass[b,c,d] (hay)	early boot or at 24-36 inches tall	every 21-35 days or at 18-36 inches tall	6 - 8[e]
Switchgrass[b,c,d] (hay)	early boot or at 24-36 inches tall	every 21-35 days or at 18-36 inches tall	6 - 8[e]
ANNUALS, WINTER			
Barley (hay, silage)	boot to soft dough	----- -----	3 - 4
Oats (hay, silage)	boot to soft dough	----- -----	3 - 4
Rye (hay, silage)	boot	----- -----	3 - 4
Wheat (hay, silage)	boot to soft dough	----- -----	3 - 4
ANNUALS, SUMMER			
Corn (silage)	grain in dent, black layer forming, 1/2 milkline	----- -----	-------
Corn, Tropical (silage)	late autumn, milk-dough	----- -----	-------
Millet, Browntop (hay, silage)	boot or at 18 to 36 inches tall	boot or at 18 to 36 inches tall	2 - 6+
Millet, German (hay, silage)	boot or at 18 to 36 inches tall	boot or at 18 to 36 inches tall	2 - 6+
Millet, Japanese (hay, silage)	boot or at 18 to 36 inches tall	boot or at 18 to 36 inches tall	2 - 6+
Millet, Pearl (Dwarf)	boot or at 18 to 36 inches tall	boot or at 18 to 36 inches tall	4 - 6+
Millet, Pearl (Tall)	boot or at 18 to 36 inches tall	boot or at 18 to 36 inches tall	4 - 6+
Sorghum-Sudan Hybrid[f]	boot or at 18 to 36 inches tall	boot or at 18 to 36 inches tall	4 - 6+
Sorghum[f] (silage)	boot or soft dough	boot or soft dough	4 - 6+
Sudangrass[f] (hay, silage)	boot or at 18 to 36 inches tall	boot or at 18 to 36 inches tall	4 - 6+

Notes:

[a] During periods of stress, leave an additional 1 to 2 inches of stubble height.

[b] Consider early spring prescribed burning at 1 to 3-year intervals.

[c] Be aware of ground nesting wildlife.

[d] Make last cutting in time to allow a height of at least 12 inches at frost.

[e] Where wildlife is a concern, the recommended stubble height is 8+ inches.

[f] Prussic acid may occur during periods of stress *(e.g., drought, frost)* or early growth.

A2 Harvest Stage and Stubble Heights for LEGUMES

Species	Stage to Harvest		Recommended Stubble Height (inches)
	1st Harvest	2nd + Harvest	
PERENNIAL, COOL SEASON			
Alfalfa (hay, silage)	bud to 1/10 bloom	bud to 1/10 bloom	2 - 4
Clover, Red[a] (hay)	1/4 to 1/2 bloom	1/4 to 1/2 bloom	2 - 4
PERENNIAL, WARM SEASON			
Lespedeza, Sericea (hay)	12 to 16 inches height	12 to 16 inches height	3 - 4
ANNUALS, WINTER			
Clover, Crimson (hay)	bud to 1/2 bloom	bud to 1/2 bloom	3-4
ANNUALS, SUMMER			
Lespedeza, Kobe (hay)	early bloom	------- -------	3 - 4
Lespedeza, Korean (hay)	early bloom	early bloom	3 - 4
Soybeans (hay, silage)	pre-pod to bean forming	------- -------	3 - 4

Notes:

[a] Typically acts as a biennial in North Carolina.